P-7.7 Compare color by transmission to color by reflection.

Revised Taxonomy Level 2.6 Compare conceptual knowledge
Physical Science students do not address this indicator

It is essential for students to

- Understand that all colors of light in combination appear as white light
- Understand that black is the absence of light
- Understand that color can be distinguished by two means, reflection and transmission
  - Color by reflection
    - The electrons surrounding each specific type of atom vibrate with a frequency that is characteristic of that atom.
    - In one material electrons vibrate easily at certain frequencies, in another material electrons vibrate easily at different frequencies
    - Light that is incident on a material will be absorbed if the frequency of the light matches the resonant frequency of the vibrating electrons
    - Most materials absorb light of some frequencies and reflect the rest
    - An object can reflect only light of frequencies present in the illuminating light
    - The color that an object appears is dependent upon the combination of the frequencies of light that are reflected by the object
  - Color by transmission
    - The color of a transparent object depends on the combination of colors of light it transmits.
    - The material in the glass that selectively absorbs colored light is know as a pigment

Assessment

As stated in the indicator, the major focus of assessment is to compare (detect correspondences) in the ways colors are produced by color absorption and by color transmission. Because the indicator is written as conceptual knowledge, assessments should require that students understand the "interrelationships among the basic elements within a larger structure that enable them to function together." In this case, assessments must show that students understand the reasons for the difference in the ways that transparent materials and opaque materials show color.